

Notice of Allowability

Application No.

09/273,806

Examiner

VAN H. NGUYEN

Applicant(s)

DUDA ET AL.

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Applicant's amendments and supporting arguments on 01/18/06.
2. ☒ The allowed claim(s) is/are 1-57.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.


Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.


WILLIAM THOMSON
SUPERVISORY PATENT EXAMINER

EXAMINER'S AMENDMENT & REASONS FOR ALLOWANCE

I. EXAMINER'S AMENDMENT:

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.
2. Authorization for this examiner's amendment was given in a telephone interview with Mr. Samuel G. Campbell, III (Reg. No.42, 381) on January 18, 2006.
3. **The application has been amended as follows:**

In the Claims:

All previous copies of claims 1, 4, 30, 33, and 55 have been replaced with the following clean copy of claims 1, 4, 30, 33, and 55 as amended by the Examiner's amendment:

Claim 1. A computer implemented method for scheduling comprising the steps of:
scheduling a resource among a plurality of elements by:

detecting expiration of a period-of-use of said resource, said resource allocated to
an active one of said plurality of elements for said period-of-use;

updating a measure-of-use of said resource for said resource for said active one of said plurality of elements responsive to said period-of-use and a measure-of-use adjustment, wherein said updating said measure-of-use comprises updating a virtual time for said active one of said plurality of elements; and

assigning one of said plurality of elements to use said resource for a second period-of-use responsive to said measure-of-use and an element-specific selection adjustment for each element in said plurality of elements, wherein said element-specific selection adjustment for said each element in said plurality of elements is borrowed virtual time.

Claim 4. The method of claim 3 wherein said virtual time for said active one of said plurality of elements is a virtual time for said active one of said plurality of threads-of-execution; wherein said updating said measure-of-use further comprises updating said virtual time for said active one of said plurality of threads-of-execution responsive to said period-of-use; and wherein said assigning said one of said plurality of elements further comprises determining an effective virtual time responsive to said virtual time and said element-specific selection adjustments.

Claim 30. A scheduling apparatus for scheduling a computer resource among a plurality of elements, comprising:

a detection mechanism configured to detect expiration of a period-of-use of said resource, said resource allocated to an active one of said plurality of elements for said period-of-use;

an update mechanism configured to update a measure-of-use of said resource for said active one of said plurality of elements responsive to said period-of-use and a measure-of-use adjustment, wherein said update mechanism comprises an update virtual time mechanism configured to update a virtual time for said active one of said plurality of elements; and

an assignment mechanism configured to assign one of said plurality of elements to use said resource for a second period-of-use responsive to said measure-of-use and an element-specific selection adjustment for each element in said plurality of elements, wherein said element-specific selection adjustment for said each element in said plurality of elements is borrowed virtual time.

Claim 33. The apparatus of claim 32 wherein said update virtual time mechanism is an update thread virtual time mechanism; wherein said virtual time for said active one of said plurality of elements is a virtual time for said active one of said plurality of threads-of-execution; wherein the update mechanism further comprises said update thread virtual time mechanism; and wherein said update thread virtual time mechanism is configured to update said virtual time for said active one of said plurality of threads-of-execution responsive to said period-of-use; and wherein said assignment mechanism further

comprises an effective virtual time determination mechanism configured to determine an effective virtual time responsive to said virtual time and said borrowed virtual time.

Claim 55. A computer program product including:

a computer usable storage medium having computer readable code embodied therein for scheduling a resource among a plurality of elements, said computer readable code including:

computer readable program code configured to cause said computer to effect a detection mechanism configured to detect expiration of a period-of-use of said resource, said resource allocated to an active one of said plurality of elements for said period-of-use;

computer readable program code configured to cause said computer to effect an update mechanism configured to update a measure-of-use of said resource for said active one of said plurality of elements responsive to said period-of-use and a measure-of-use adjustment, wherein said update mechanism comprises an update virtual time mechanism configured to update a virtual time for said active one of said plurality of elements; and

computer readable program code configured to cause said computer to effect an assignment mechanism configured to assign one of said plurality of elements to use said resource for a second period-of-use responsive to said measure-of-use and an element-specific selection adjustment for each element in said plurality of elements, wherein said element-specific

selection adjustment for said each element in said plurality of elements is borrowed virtual time.

II. REASONS FOR ALLOWANCE:

1. The following is an examiner's statement of reasons for allowance:
2. Formal drawings filed on March 22, 1999 are acceptable.
3. The prior art does not expressly teach or render obvious the invention as recited in independent claims 1, 30, and 55 as amended above.
4. Jones et al. (U.S. 5,812,844) teaches the invention substantially as claimed including a computer implemented method for scheduling a resource among a plurality of elements as described in independent claims 1, 30, and 55 [see the Abstract; cols. 4-7; and fig. 7]. However, the claimed "*wherein said updating said measure-of-use comprises updating a virtual time for said active one of said plurality of elements; and wherein said element-specific selection adjustment for said each element in said plurality of elements is borrowed virtual time*", when taken in the context of the claims as a whole, was not uncovered in the prior art teachings.
5. Nor were references uncovered that would have provided a basis of evidence for asserting a motivation that one of ordinary skill level in the art at the time the invention was made, knowing of a method for scheduling a resource among a plurality of elements in this specific environment, would have integrated or modified to teach the method for scheduling a resource among a plurality of elements using *a borrowed virtual time scheduling process* as recited in the context of independent claims 1, 30, and 55.

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6. Dependent claims are allowed as they depend upon allowable independent claims.
7. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

CONTACT INFORMATION

Any inquiry concerning this communication or earlier communications from the examiner should be directed to VAN H. NGUYEN whose telephone number is (571) 272-3765. The examiner can normally be reached on Monday-Thursday from 8:30AM - 6:00PM. The examiner can also be reached on alternative Friday. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, WILLIAM THOMSON can be reached at (571) 272-3718.

The fax phone number for the organization where this application or proceeding is assigned is **571-273-8300**.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any response to this action should be mailed to:

Commissioner for patents
P O Box 1450
Alexandria, VA 22313-1450


WILLIAM THOMSON
SUPERVISORY PATENT EXAMINER

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